

Stone Horse Bluff

**OPERATION & MAINTENANCE
MANUAL**

FOR

DRAINAGE FACILITIES AND OPEN SPACE TRACTS

Spokane County, WA

WCE W.O. No. 04-65

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By

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**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

1.00 PURPOSE

This Operations and Maintenance manual is intended to provide general operations and maintenance guidelines for the drainage ponds and other drainage facilities, open spaces and other subdivision amenities located in the plat of Stone Horse Bluff, a residential development project. Because of the general project layout, Spokane County looks to the Homeowners Association to maintain the drainage facilities as well as the roadway surfaces, curbs, gutters, sidewalks, and open spaces within the plat. This includes general maintenance for all drainage facilities whether in or out of Spokane County public road rights-of-ways. Implementation of these guidelines will ensure that the following subdivision facilities that were constructed as a part of the subdivision will function as designed, these facilities are generally;

1. Storm drainage ponds, tract swales, roadside swales (catch basins/ curb inlets), concrete gutters and drywells.

2. Private Roads and appurtenances

- Caspian Lane
- Arabian Lane
- Thoroughbred Lane
- Stone Horse Bluff Lane
- Appaloosa Lane
- Cleveland Bay Lane
- Buckskin Lane
- Pinto Lane
- Belgian Lane
- Shetland Lane
- Shire Lane
- Palimino Lane

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

2.00 INTRODUCTION

The Stone Horse Bluff Final Plat includes public roads and private roads (lanes). The public/private road system drains to several ponds and swales within the plat boundary. Therefore, the Drainage Facilities associated with this project will need to be maintained as a part of the functions of the Homeowners Association (HOA) and the adjacent lot owners. This Operations and Maintenance (O&M) Manual will follow the sub-section guidelines noted below throughout this manual.

1. Public/private streets, curbs and sidewalks
2. Storm drainage ponds pipes and drainage structures
3. Private "Public" open spaces within the subdivision.
4. Other subdivision facilities such as the perimeter fence, etc...

2.10 Public Streets

The public street system within or adjacent to the Stone Horse Bluff subdivision will require little to no maintenance from the residents of the subdivision, any periodic damage that may be recognized should be reported to Spokane County for maintenance, this includes the pavement, curbs, sidewalks, and catch basins that handle public water from the roadway system. The roadside swales lying within the border easements must be maintained by the HOA or the adjacent homeowners, some lots will have more to maintain than others, but these guidelines cover the minimum requirements. Please note that the following swales laying in the Public ROW or border easement will specifically need to be maintained by the HOA or adjacent lot owner.

- A. Swales along Dakota Road maintained by lots 12-13, block 18, lots 7-8, block 3 and lots 1&16, block 2, respective to location.**
- B. Swales along Perry Road maintained by lots 1-3, block 11, lots 1-8, block 12, and lots 1-8, block 13, respective to location.**

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

2.15 Private Streets

Generally the private street system within the Stone Horse Bluff subdivision will require little to no maintenance from the residents of the subdivision for the first 10 to 15 years of its life. The streets within the subdivision that will require private maintenance are as follows.

- **Caspian Lane**
- **Arabian Lane**
- **Thoroughbred Lane**
- **Stone Horse Bluff Lane**
- **Appaloosa Lane**
- **Cleveland Bay Lane**
- **Buckskin Lane**
- **Pinto Lane**
- **Belgian Lane**
- **Shetland Lane**
- **Shire Lane**
- **Palimino Lane**

The types of general maintenance that would be required to be administered by the homeowners association would be periodic plowing during winter, periodic street sweeping during the spring or summer and asphalt crack sealing as necessary as well as inspections for broken curb and sidewalk and replacement on a periodic basis.

2.20 Storm drainage ponds, pipes and drainage structures

The drainage system as designed is intended, through a series of processes, to treat and discharge the increase in storm water runoff generated on-site. This water is created by the construction of the impervious surfaces such as buildings, paved parking areas, streets, garages and sidewalks. Generally, the resulting stormwater is routed via gutter, curb inlet, catch basin, pipe or swale to a stormwater swale or roadside swale. These onsite swales then retain, treat and discharge the excess stormwater at specified rates by either allowing the water to evaporate, infiltrate through the pond bottom and during extreme storm events through the drywells installed within these facilities. The drainage facilities in this subdivision are comprised of several elements as follow.

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

2.20.A. Conveyance

For this development conveyance is comprised of the following elements:

- Catch Basins/Inlets
- Pipes
- Gutters
- Curb Inlets
- Grassy Swales

2.20.B. Storage

For this development storage is comprised of the following elements:

- **Dakota Swales – Grassy swales located adjacent to Dakota Road. The swales are for additional treatment of the stormwater runoff above the required treatment. There is one grate located in the swales which collects overflow and pipes it to Pond C.**
- **Perry Swales – Grassy swale located adjacent to the east side of Perry Road. The swales are for additional treatment of the stormwater runoff above the required treatment.**
- **Pond A – Located at the intersection of Arabian Lane/Caspian Lane and Caspian Lane/Thoroughbred Lane. This is for the treatment of stormwater collected in a pipe network and curb inlets for a portion of Arabian Lane, Caspian Lane, a portion of Thoroughbred Lane, and a portion of Dakota Road. The pond contains concrete inlets to drywell design for overflow.**
- **Pond B – Located at the intersection of Stone Horse Bluff Lane/Buckskin/Cleveland Bay Lane. This is for the treatment of stormwater collected in a pipe network for a portion Arabian Lane, Buckskin Lane, a portion of Stone Horse Bluff Lane, and a portion of Cleveland Bay Lane**
- **Pond C – Located at the southwestern portion of the plat adjacent to Dakota Road. This is for the treatment of stormwater collected in roadside swales and a pipe network system for Dakota Road, Appaloosa Lane, Cleveland Bay Lane, and a portion of Stone Horse Bluff Lane.**
- **Pond D – Located at the intersection of Pinto Lane/Thoroughbred**

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

Lane. This is for the treatment of stormwater collected in a pipe network for Belgian lane, a portion of Arabian Lane, a portion of Thoroughbred Lane, and Pinto Lane.

- **Pond E** – This is located at the intersection of Shetland Lane/Stone Horse Bluff/Perry Road. This is for the treatment of Shetland Lane, a portion of Stone Horse Bluff, a portion of Thoroughbred Lane, a portion of Arabian Lane, a portion of Perry Road.
- **Pond F** – This is located between Lots 46 and 47, Block 3 along Cleveland Bay Lane. This pond is for the treatment of a portion of Cleveland Bay Lane, Quarterhorse Lane, a portion of Appaloosa Lane, a portion of Stone Horse Bluff Lane, and a portion of Perry Road.
- **Pond G-1a** – This is located at the intersection of Shire Lane and Perry Road. This pond is for the treatment of a portion of Perry Road, a portion of Center Road, a portion of Palimino Lane, and a portion of Cleveland Bay Lane. This pond is connected to Pond G-1b by an equalizer pipe.
- **Pond G-1b** – This is located at the intersection of Shire Lane and Palimino Lane. This pond is for the treatment of a portion of Center Road, a portion of Palimino Lane, and a portion of Cleveland Bay Lane. This pond is connected to Pond G-1a by an equalizer pipe.
- **Pond G-2** – This is located adjacent to east side of Perry south of Shire Lane. This pond is for the treatment of a portion of Perry Road, a portion of Palimino Lane, and a portion of Shire Road.
- **Pond H** – This pond is located between the hammerheads of Appaloosa Lane and Cleveland Bay Lane. The pond is for the treatment of a portion of Stone Horse Bluff Lane, a portion of Cleveland Bay Lane, and a portion of Appaloosa Lane.

2.20.C. Treatment and Discharge

For this subdivision treatment and discharge is comprised of the following elements:

- **Dakota Swales** – Swale bottom infiltration and drywell discharge (drywells located in Pond C).
- **Perry Swales** – Swale bottom infiltration and drywell discharge (drywells located in Pond G-1a and Pond G-1b).
- **Ponds A-H** – Pond bottom infiltration and drywell discharge (many drywells

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

are a concrete inlet to drywell system).

As shown, there are limited drainage solutions for this development. It is therefore of the utmost importance to provide adequate operations and maintenance activities to ensure that the conveyance elements remain silt or dirt free, as free flowing silt or dirt will affect the ability for the curb and gutters and or catch basins and pipes to adequately pass or discharge stormwater and may lead to the ponding of water within the driving areas, thereby increasing street maintenance activities. Should these facilities fill up or become clogged, the only remedy would be to remove the silt and debris. Therefore, periodic maintenance is a must. A full set of engineering drawings are available for review at Spokane County Department of Public Works.

2.30 Private "Public" Open Spaces

Generally, within this subdivision there are Private "Public" Open Space tracts other than those dedicated to storm drainage. Maintenance for these facilities shall be performed by the HOA.

2.40 Other Subdivision Facilities (perimeter sight obscuring fence)

Generally, this subdivision was developed with other subdivision facilities such as street lighting, perimeter fencing, etc... Street lighting is maintained by Avista or the local provider in this area and any issues with street lighting should be remedied by a call to Avista or the other local provider. Perimeter fencing is a subdivision issue in that the perimeter fence should be maintained by the individual lot owners.

3.00 GENERAL OPERATIONAL CHARACTERISTICS

3.10 Public Streets including Curb and Sidewalks – Within this subdivision the elements listed below are PUBLIC and the maintenance responsibility lies with Spokane County. However, a periodic visual inspection of the facilities should be performed to remedy any defects or problems and any required maintenance. Generally, the PUBLIC roads and driveways are intended to facilitate lot access. The sidewalks are intended to provide non-motorized travel along and access to the public street system as well as provide a safe walking surface out of the roadway prism. Both the sidewalks and public roads as designed should deliver a useable service life for 20 to 30-years, if properly maintained. This will include periodic snow removal, sweeping, crack sealing and periodic replacement of damaged or broken elements. The sidewalks are probably most vulnerable to trees planted too close to the sidewalk and

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

root damage, the result of poorly maintained sidewalks would result in the potential for a tripping hazard to occur, and if so remedy the situation immediately by contacting Spokane County.

- **Dakota Road**
- **Perry Road**
- **Center Road**

3.15 Private Streets including Curb and Sidewalks – Within this subdivision the elements listed below are private and the maintenance responsibility lies with the members of the homeowners association. A periodic visual inspection of the facilities will usually identify any required maintenance. Generally, the private roads and driveways in the subdivision are intended to facilitate lot access from the public roads surrounding the subdivision. Much like the private roads, the sidewalks within the subdivision are intended to provide non-motorized access to the public street system as well as provide a safe walking surface out of the roadway prism. Both the sidewalks and private roads as designed should deliver a useable service life of 20-years, if properly maintained. This will include periodic snow removal, sweeping, crack sealing and periodic replacement of damaged or broken elements. The sidewalks are probably most vulnerable to snow plow damage due to the presence of rolled curbs as well as trees planted too close to the sidewalk and root damage, the result of poorly maintained sidewalks would result in the potential for a tripping hazard to occur, and if so remedy the situation immediately. Regardless, because these are private facilities for the benefits of the residents of the subdivision it is the responsibility of the homeowners association to maintain these in good and safe working order.

- **Caspian Lane**
- **Arabian Lane**
- **Thoroughbred Lane**
- **Stone Horse Bluff Lane**
- **Appaloosa Lane**
- **Cleveland Bay Lane**
- **Buckskin Lane**
- **Pinto Lane**
- **Belgian Lane**
- **Shetland Lane**
- **Shire Lane**
- **Palimino Lane**

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

3.20 Storm Drainage Facilities - The drainage facilities for the subdivision are generally very simple, functional, and have low maintenance requirements. A periodic visual inspection of the facilities will usually identify any required maintenance. Most maintenance will consist of keeping the catch basins, curb inlets, drywells and other drainage structures including grassy swales, and ponds free of deleterious debris and sediment. However, a specific inspection schedule should be followed to ensure proper and safe operating conditions. See Section 4.0 for recommended maintenance schedules.

3.21 Conveyance Facilities including Catch Basins, Pipes, Gutters, Curb Inlets and Grassy Swales

Within this development, the street gutters function as storm pipes directing stormwater to the roadside swales and pond locations. The concrete curb inlets and catch basins capture the gutter flow and transfer this flow to the roadside swales or pond locations.

3.22 Storage Facilities including Drainage Ponds

As designed, this project intends to collect the rainfall or snow melt runoff from the streets, driveways, parking facilities, buildings, garages and all other paved facilities. It is intended that the rainfall or snow melt water will go into the various ponds via curb inlets, grassy swales, and catch basins. For this development, there are numerous swales and/or roadside swales required for treatment, storage and discharge which require maintenance. The approved plans for the Stone Horse Bluff development can be obtained at Spokane County shows their locations. The swale detail sheets from that plan set are listed below.

- **Sheet 37-41 of 43 – Swale and Pond Details**

3.23 Treatment Facilities including Drywells and Pond Bottoms

As described earlier, the general operational procedures for the storm drainage system designed for this development uses both swale bottoms and drywells as drainage discharge options. Therefore, it will be important to keep the pond bottoms watered during the summer months but not over watered or saturated. They should remain dry enough to support the weight of a standard riding lawnmower without sinking into the grass and creating ruts while at the same time promoting a thick stand of “green” or healthy grass. The reason for this is that it is the grass, thatch and root structure that

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

provide the brunt of the treatment processes prior to discharging to the underlying soils and ultimately to groundwater.

As designed, the pond bottoms should always remain at least 6-inches below the top of the drywells or other discharge elements such as conveyance pipes or inlets. This will ensure that most of the rainfall and snow melt runoff events that occur will rarely discharge via the drywells and most discharge will occur either through evaporation, plant uptake, or infiltration to the underlying soils. The drywells are in place in case of a higher than normal storm events to ensure that there will be no resulting property damage from a rainfall or snow melt event where runoff is considerably higher than normal. Generally and for practical purposes, a storm event of 30-years or less will not create enough runoff to discharge to the drywell, unless the pond bottoms are frozen. You should not be surprised if you hear of a 50-year event and no water went into the drywells because each pond has the ability to discharge water via infiltration at different rates. Therefore, it is extremely important that pond bottom health and periodic maintenance of the pond bottom grass is achieved.

3.24 Winter Operations

During the winter, snow removal operations, as much as possible will require that snow should be plowed directly into one of the site ponds; the preference would be to move the snow to roadside swales on the project site rather than plowing directly to the site pond. This will allow for freeze / thaw and other snow melt runoff scenarios to occur without creating large ice patches within the project site.

3.30 Private "Public" Opens Spaces – This is a general description and may not apply to every project or Tract of land.

The open spaces in this development as previously described should remain virtually maintenance free, with the exception of any watering, weeding and mowing.

Primarily, the open space areas are to virtually remain as constructed with the exception that plants grow and die and therefore watering, maintenance or care is required to keep these in a healthy growing state. Generally, water needs to be turned on in the spring; the pipes and sprinkler heads must remain in good working condition and if dry spots occur they should be fixed. In the fall the sprinkler system should be turned off and "blown out" to keep the elements free from freezing. Other weekly or bi-weekly maintenance should consist of mowing the lawn and trimming the shrubs, hedges and trees as necessary. On a seasonal basis, shrubs should be replaced if dead or dying, however, if discovered in the fall, this should not take place until spring the following year. These basic steps along with applying fertilizer as necessary and

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

weed control should allow these open space areas to remain useable for years to come.

There are some areas that will not require watering and may be left in its natural vegetated state. These areas should be checked periodically for maintenance and general care.

In the event that the homeowners association is dissolved, it should fall on the adjacent properties to maintain the open spaces and pond areas as a continuation of their property.

3.40 Other Subdivision Facilities (perimeter sight obscuring fence)

The perimeter fence should be visually inspected once a year by each homeowner along their property line and should issues with poor fence quality or damage occur, the individual homeowner must make the necessary repairs if the homeowners association does not.

- **For the Stone Horse Bluff development all lot fences are privately owned and maintained and the HOA has no fence maintenance responsibilities at this writing.**

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

4.00 MAINTENANCE REQUIREMENTS AND SCHEDULES

4.10 Roads, Streets, Lanes, Curbs and Sidewalks - Below is a maintenance description for each of the elements contained within the Stone Horse Bluff development.

General

While the PUBLIC and PRIVATE road surfaces, concrete curbs and sidewalks will last for 20 to 30 years with proper maintenance, these facilities do require maintenance to reach these design time frames. Without the proper maintenance of these facilities, their lifespan can be significantly reduced by 5 to even 10 years. The single most important concept to achieve a reasonable life for these facilities is to continue to protect these elements from water intrusion below the surface.

4.10 Public Roads – The public roads within or adjacent to this subdivision should be visually inspected each season (spring, summer, fall and winter). It is important to remember that while public road maintenance is the responsibility of Spokane County, adjacent homeowners can be a helpful resource to the County. For the Public Roads, special attention should be paid in the spring when the spring thaw occurs. The inspector/home owner should be mindful of cracks in the asphalt paving surface, as asphalt is not a rigid pavement surface but a flexible pavement surface, it bends when you drive on it and the tension face is on the bottom of the asphalt. This is important to understand as a ½-inch crack on the pavement surface is probably representative of a 1 to 2-inch crack at the bottom face of the asphalt that you cannot see. So on an annual basis in the Fall, adjacent homeowners should encourage the County to perform crack sealing operations just before the Fall rains start in October. Additionally, in 2012 the adjacent homeowners should encourage the County to routinely monitor the public road noted below and initiate a maintenance program where all cracks and seams should be “Crack Sealed” by an asphalt specialist or paving company to insure that no water can get into the pavement subgrade, unless cracks or gaps are noted earlier.

- **Dakota Road**
- **Perry Road**
- **Center Road**

4.15 Private Roads, Lanes and Driveways – The private roads, lanes and driveways within this subdivision should be visually inspected each season (spring, summer, fall and winter). Special attention should be paid in the spring when the spring thaw occurs. The inspector should be mindful of cracks in the asphalt paving surface, as

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

asphalt is not a rigid pavement surface but a flexible pavement surface, it bends when you drive on it and the tension face is on the bottom of the asphalt. This is important to understand as a ½-inch crack on the pavement surface is probably representative of a 1 to 2-inch crack at the bottom face of the asphalt that you cannot see. So on an annual basis in the Fall, just before the Fall rains start in October and probably starting in the 5th year (**2012**), all cracks and seams should be “Crack Sealed” by an asphalt specialist or paving company to insure that no water can get into the pavement subgrade. The private roads/lanes in this subdivision are as follows:

- **Caspian Lane**
- **Arabian Lane**
- **Thoroughbred Lane**
- **Stone Horse Bluff Lane**
- **Appaloosa Lane**
- **Cleveland Bay Lane**
- **Buckskin Lane**
- **Pinto Lane**
- **Belgian Lane**
- **Shetland Lane**
- **Shire Lane**
- **Palimino Lane**

4.16 Concrete Curbs – Using the underlying assumption that water is the enemy of every roadway, curbs are the roadways saving grace as the curbs transfer water from the asphalt surface to a pond or other conveyance facility away from the roadway subgrade. Therefore, curbs should be treated as an extension of the asphalt surface and should be checked each year for cracks between the pavement and the curb as well at joints along the curb length. These cracks should be crack sealed at the same time as the roadway and this process should begin in the 5th year (**2012**), unless cracks or gaps are noted earlier.

4.17 Concrete Sidewalks – Without damage from either very heavy vehicles, snow plows or trees the sidewalks within this development should provide 20 to 40 years of worry free service. Therefore, it is important that the sidewalks be inspected once yearly and the concern is the creation of uneven walking surfaces that will result in a tripping hazard. In the event that individual sidewalk panels are damaged, Spokane County (PUBLIC ROADS) should be contacted and the bad panels and the cause of the problem should be removed and fixed and new panels installed. The inspections and replacement of this item will run with the project from the very first day.

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

Replacement and inspection for the sidewalks should occur in the spring with summertime replacements as a goal.

4.20 Storm Drainage Facilities – Following are maintenance descriptions for each of the drainage system elements contained within the Stone Horse Bluff development, including the conveyance, storage, treatment and discharge. All drainage facilities located outside of County road rights-of-way or border easements and within tracts or lots are expected to be maintained by the land owner or homeowners association (HOA). Usually these are along PRIVATE ROADS OR LANES. Maintenance activities for this development are expected to always be maintained by the adjacent land owner or HOA, and this responsibility shall run with the land in the event of sale or transfer of ownership or dissolution of the homeowners association.

Roadside swales that are adjacent to the PUBLIC ROADS and either located within the right of way or within border easements, while generally the responsibility of Spokane County, are to be maintained by the adjacent land owner. It should be noted that the roadside swales while they may contain drywells, will require maintenance from the adjacent lot owner and should be maintained as noted below. Please note that the maintenance and/or replacement of drywells or inlets within the Public Right of Way and or Border Easements are the responsibility of Spokane County. Maintenance activities for this development along PUBLIC ROADS are expected to always be maintained by the land owner, and this responsibility shall run with the land in the event of sale or transfer of ownership or dissolution of the homeowners association.

General

Proper maintenance procedures are a necessity for the continued functioning of the drainage facilities. Improper maintenance, or lack of attentive maintenance measures, may result in substantial on-site and downstream impacts. It is strongly recommended that the HOA President designate an individual, such as the HOA President, who will be responsible for making sure the maintenance measures are implemented.

Generally, land owners or members of the HOA are to conduct a visual inspection of the drainage facilities immediately following a substantial rainfall or snowmelt event. This could be that it rained noticeably hard for a short period (30 minutes or more) or that it rained steadily for a long period (6 hours or more) or if a significant rainfall and then snow melt event, associated with a “Chinook” melt were to occur in January, February or March when the ground has a high likelihood to be frozen. For long duration storms, greater than 24 hours, land owners or members of the HOA are encouraged to inspect the drainage facilities during the storm event to identify any developing problems and

**STONE HORSE BLUFF
DRAINAGE FACILITIES AND OPEN SPACE TRACTS
OPERATION & MAINTENANCE MANUAL**

correct them before they become major problems.

4.21 Storm Events General Inspection Responsibilities

1. Inspect all catch basin, gutters, concrete channels, inlets, drywells, swales, ponds or other appurtenances, making sure that they are clear of debris and obstructions.
2. Inspect the pond banks/sides/berms, making sure there are no breaches or breaks in the sides of the pond. Immediately repair any breaches or breaks, with a sandy loess soil, compacted in place and follow up after the storm event with more substantial maintenance activities.
3. Inspect the pond bottoms and be sure that they are free of trash or other debris that would preclude the infiltration of stormwater. Additionally, the drywell, conveyance pipes and catch basins within the ponds should be checked to be sure that they are free of debris and remain free draining.
4. Inspect the walls for any breaches or breaks. Immediately repair any problems.

These above noted storm event related visual inspections (no. 1, 2, 3, and 3) are in addition to the regular maintenance schedules noted for each item, which follow:

4.22 Conveyance

Inspection of the following items should be performed once in the spring and once in the fall as noted:

- Drainage Structures (catch basins, inlets and drywells) – should be visually inspected by either looking through or removing the grate to insure that no build up of sediment or other deleterious material is blocking the opening to the pipe. If encountered the extra sediment and deleterious material should be removed.
- Pipes – pipe ends should be inspected for breakage, crushing or other damage which could impede storm water flows.
- Gutters – should be evaluated for settling, cracking, spalling or other damage that would impede the flow of storm water or other runoff from reaching the curb inlets and pond bottoms.
- Curb Inlets – should be evaluated for sediment or grass encroachment at the inlet/curb interface. This material should be removed and the inlet should be free and clear of sediment, weeds, grass or other deleterious material to ensure free flow into the grassy swales and ponds, with no ponding in the adjacent

**DRAINAGE PONDS & OTHER DRAINAGE FACILITIES
OPERATION & MAINTENANCE MANUAL**

PUBLIC ROAD or PRIVATE ROAD/LANE.

- Grassy Swales - should be evaluated for mowing damage, under watering, over watering and the presence of extra sediment. In the event that any of these elements are found, remediation back to a green healthy stand of mowed grass should be performed. Extra sediment should always be removed from the swale.

DRAINAGE PONDS & OTHER DRAINAGE FACILITIES OPERATION & MAINTENANCE MANUAL

4.23 Storage

Inspections of all the ponds and swales should be made once in the spring, once in the summer and once in the fall. However, pond bottoms should be inspected monthly to be sure that no unusual sediment, debris, trash or other deleterious materials have gathered in the pond bottom, if observed or discovered this material should be removed immediately. Additionally, it is required that a good stand of green, mowed grass be maintained within each of the noted ponds throughout the growing season and that they be irrigated from May through September of each year. During the irrigation and normal growing season it is imperative that the pond bottoms not be over watered and become saturated to the point that they will not support a normal sized riding lawn mower. Over saturation of the pond bottoms generally will result in several things, first the wet area not being mowed and/or second the wet area being mowed and rutted with mud coming to the surface, thereby affecting pond operations. In the event that pond bottom saturation occurs, it must be immediately remedied. In the event that earlier saturation has caused damage to the pond bottoms, the damaged area must be removed and replaced with sod of similar characteristics of the existing pond bottom. This applies to all of the ponds and grassy swales within this development.

4.24 Treatment and Discharge

Inspection of all the ponds, swales, inlets and drywells should occur twice a year, once in the spring and once in the fall. These elements should be inspected to insure that the grates, conveyance pipes or catch basins are not plugged or full of deleterious materials, which should be removed.

4.30 Private "Public" Open Spaces – The following is a general discussion that may apply to the drainage tracts and swales for this project.

All of the open spaces within this subdivision should be treated as if they were an extension of the HOA member's individual lawns. If the grass needs to be mowed, mow it; if the weeds need to be pulled or sprayed then spray them; if the sprinklers don't work, fix them. It is the recommendation of this author that the HOA on an annual basis contract with a landscaping company that can maintain the open space areas and plow snow in the winter from the public roads in the event that the County does not or cannot plow.

4.40 Other Plat Amenities (Plat Fence) – These amenities including the fence should be inspected annually. Generally the individual homeowners should inspect the fence in their respective backyards and either perform the maintenance directly or lobby the HOA for funds to repair this fence, if applicable. As this project was not a PUD, no

DRAINAGE PONDS & OTHER DRAINAGE FACILITIES OPERATION & MAINTENANCE MANUAL

exterior tract fencing was required. However, in the future the HOA may decide to fence the storm drainage tract and this would apply to that fencing. All rear yard fences are 100-percent the responsibility of the individual home owner. Below is a list of those lots that can receive funds from the HOA for fence repair.

- **None**

Other Amenities that will require maintenance and their schedules

- **Tract areas outside of drainage tracts.**
To be inspected in the spring, mid summer, and late fall

See section 2.40 for a description of inspection criteria.

**DRAINAGE PONDS & OTHER DRAINAGE FACILITIES
OPERATION & MAINTENANCE MANUAL**

5.00 Recommended Set-Aside Funds for Maintenance & Future Replacement Costs

There will be annual costs which will be required to maintain the described facilities within this development. Similarly, there will be replacement costs and major renovation costs of all the describe facilities which will occur in the future. These replacement costs are the responsibility of the Homeowners Association or successors in interest. Future replacement and major renovation costs have been converted to annual costs, in the form of recommended set-aside funds.

Table 5.00 Annual Cost Summary

Development Facility	Annual Maintenance Costs	Annual Set-Aside Funds for Future Replacement or Major Renovation ^(1,2,3,4)
Asphalt Pavement ⁽⁸⁾	\$ 2,400	\$ 5,050
Curb and Sidewalk ⁽⁹⁾	\$ 1,680	\$ 3,525
Drainage – Storage ⁽⁵⁾	\$ 1,200	\$ 2,525
Drainage – Conveyance ⁽⁶⁾	\$ 1,200	\$ 2,525
Drainage – Treatment and Discharge ⁽⁷⁾⁽¹⁰⁾	\$ 1000	\$ 2,100
Private “ Public” Open Space	\$ 0.00	\$ 0.00
Other – Fence	\$ 0.00	\$ 0.00
Totals	\$1,650.00	\$ 4,225.00

- Note:
- (1) Any renovation costs for facilities are included in the annual maintenance costs.
 - (2) Life expectancy of Roadway elements (pavement, curb and sidewalk is 30-years @ 2.5%
 - (3) Life expectancy of Conveyance and Treatment facilities is 30-years @ 2.5%
 - (4) A portion of the annual costs are combined with pavement for snow plowing, replacement at 30-years @ 2.5%
 - (5) Storage includes only that storage in the Tract Ponds; storage in swales would be exclusive of the HOA and the responsibility of the adjacent lot owner
 - (6) Conveyance includes swales, curb inlets at tracts etc... it does not include public curb and gutter @ 25,206 lf @ \$10.00/lf replacement cost (2007 dollars) assumes 20% replacement over 30 years
 - (7) Treatment and Discharge includes tract ponds and drywells but excludes drywells in the ROW and/or Border Easement areas
 - (8) Pavement Annual fee assumption is seal coat at 10-year intervals of \$24,000 each (2007 dollars)
 - (9) Curb and sidewalk Annual fee assumption is replacement @ \$50,400 assumes 20% replacement (2007 dollars) within 30 years
 - (10) Drywell replacement assumption @ \$29,700 (2007 dollars)

**DRAINAGE PONDS & OTHER DRAINAGE FACILITIES
OPERATION & MAINTENANCE MANUAL**

The estimated annual maintenance costs and recommended annual set-aside costs are listed in Table 5.00A. It is recommended the project owner or management set-aside these amount of funds annually, to ensure that adequate maintenance and replacement measures of the drainage facilities will be implemented.

Table 5.00A – Cost Per Lot/Unit Evaluation

Anticipated Total Cost Per Year	\$7,480 + \$15,725 = \$23,205	
Number of Lots/Units	421 Lots	
Anticipated Cost Per Year Per Lots/Units	\$23,205/421 = \$55.12 per year or \$5/mo	
Value @ 30 years for major Improvements	\$5/mo x 360 x 421 lots	\$757,800